

# The Canadian Entomologist

VOL. LVIII.

ORILLIA, MAY, 1926.

No. 5

## METHODS OF COLLECTING MOTHS.\*

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For several years the writer and his student assistants have experimented with various methods of collecting cutworm moths. The chief difficulty to be overcome, when collecting large numbers, is the ease with which the moths become so rubbed as to be unidentifiable. At least one type of trap has been tried and discarded each season, and, while some of our difficulties are far from solution, yet two developments have proven so simple and useful that they may be of value to other workers. These are a portable electric light trap and a moth collecting jar.

### PORTABLE ELECTRIC LIGHT TRAP

In field work there are many times when it is very desirable to operate a light

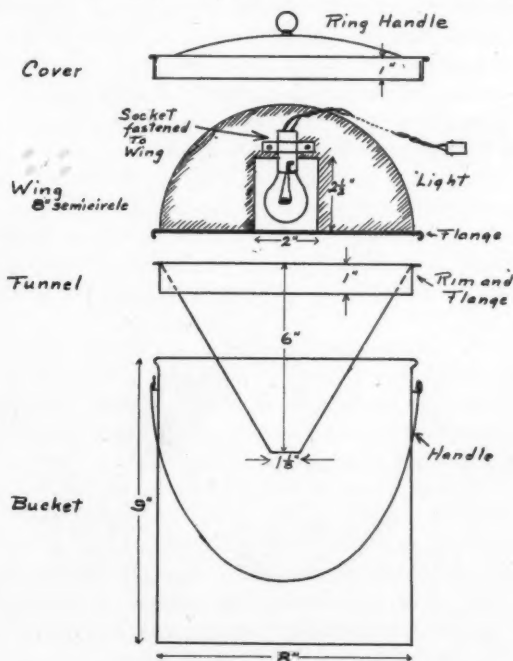


Figure 1  
Portable Electric Light Trap

trap, but often there is no nearby source of current for an electric light. Other

\*—Contribution from the Entomology Department, Montana Agricultural Experiment Station.

sources of light, such as kerosene and actylene, are very useful for permanent installations, but lantern traps are necessarily cumbersome, and require some little time for assembling and dismantling. In order to avoid these difficulties, a portable electric light trap has been designed, which operates from an automobile storage battery.

As may be seen from the sketch (Figure 1), it is made of four pieces, and it is entirely self-contained when not in use. It consists of a bucket 9 inches deep, into the top of which a funnel is fitted. A wing, holding the light bulb, slides over the rim of the bucket and funnel, and a fifteen-foot cord connects the light to the dashboard socket of the car. The bulb used is a six-volt, 21 candle-power auto headlight, which gives a powerful, concentrated light. A layer of cotton is placed in the bottom of the bucket, which receives about ten c. c. of chloroform. A second dry layer is placed above this one to catch the moths, and keep them from contact with the chloroform.

To dismantle the trap, the wing, with the light cord coiled around it, is placed in the bucket, the funnel replaced, and the cover fitted over the top. The cover confines the fumes of the chloroform, and the insects which entered last are killed in a short time. If desirable, the moths may be left in the bucket and protected by another layer of cotton until there is a favorable opportunity for examination. There is sufficient space in the bottom of the bucket to hold also a six-ounce bottle of chloroform.

The performance of the trap is excellent. Its operation has been watched many times, and it has been noted that nearly all moths attracted by the light are captured. As the insects approach the intense light they seem to become dazzled, and they often plunge directly downward into the bucket without even touching the wing or light. The particular trap we are using has caught 494 cutworm moths in three hours, and has a record of capturing 7,159 adults of *Loxostege sticticalis* in forty-five minutes. The insects are captured in excellent condition, and our proportion of badly rubbed material never runs over five per cent.

#### MOTH COLLECTING JAR

We have done considerable collecting of cutworm moths at flowers, attempting to secure quantitative collections from various food plants to check with the trap catches. Previous to 1924, most of this collecting was done in the late afternoon and early evening, with net and cyanide bottles. At this time the moths are very active and difficult to capture. In 1924, Walter Stanley, my assistant, discovered that it was much easier to collect adults after dark by approaching the flowers with a lantern and capturing the moths in cyanide vials. As soon as it becomes completely dark, and the temperature falls below 20° C. (68° F.) the moths settle down to feed, and are not easily alarmed. We captured over 2,000 moths in that manner in 1924, but a large percentage of the material was badly rubbed, and consequently unidentifiable. In order to secure the moths in better condition, a collecting jar has been devised, which is very simple to use, and might be adapted to daytime collecting of other insects.

This collecting jar (Figure 2) is made by adding a funnel to a one-quart fruit jar of the "Kerr Wide-Mouth Self-Sealing Mason" type. This type of jar has a flat metal cover which is held in place by a separate ring. The wide mouth of the jar allows the insertion of the hand for placing cotton and removing insects.

The funnel is a plain tin funnel, with the top turned into a flat rim  $1/8$  inch wide, which rests on the top of the jar. When preparing it for use, the cover, ring and funnel are removed, and the jar is charged with chloroform in the same way as with the light trap. The funnel is then replaced and held in position by the ring. The cover is not used while collecting, as the small aperture at the lower end of the funnel sufficiently retards the escape of the chloroform fumes. It is merely necessary to hold this jar under the blossom on which a moth is feeding, and shake the blossom lightly. The moth will loosen its hold and fall into the funnel.

Five c. c. of chloroform will charge a quart jar for a two-hour collecting period. At the end of the period the cover is replaced, and the moths are confined in an atmosphere of chloroform vapor until the next morning. For field work about eight or ten of these jars are prepared and used in turn, each being numbered to correspond with field notes. ✓

The insects are obtained in surprisingly perfect condition. In 1925, out of over 8,400 moths so captured, only 260, or about three percent, were so badly rubbed as to be unidentifiable, and a large percentage of the total catch was obtained in perfect condition. In fact, it may be said that the moths are brought into the laboratory in the same condition in which they are found in the field. The number of moths captured in the bottle at once seems to have little to do with this. One collection of 400 moths taken in one bottle at one time contained but seven unidentifiable specimens.

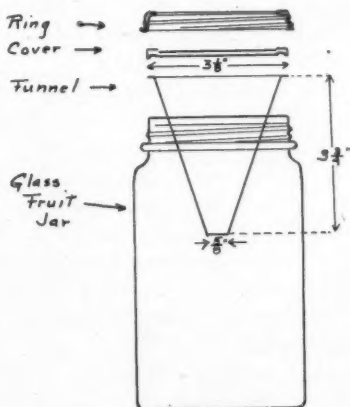


Figure 2  
*Moth Collecting Jar*

This collecting jar is also useful to capture live moths for breeding work. When so used, the chloroform is omitted and the layers of cotton are replaced by about one to two inches of very loose cotton, into which the moths may burrow. Very few escape during the collecting period, and the cover is replaced at the end of the period.

#### KILLING AGENTS

Several different killing agents have been tried in this work. Chloroform

is by far the most satisfactory killing agent for field collecting when the time period is short. It stuns the insects immediately, and prevents the removal of scales by the moths crawling over each other. For a stationary trap, to be run all night, carbon tetrachloride is somewhat preferable. It does not kill quite so quickly, and requires a higher concentration of vapor, but the vapor is heavier than chloroform, and does not escape so rapidly. Comparing equal charges of the two compounds, we have found that many times moths will be found alive in the trap the next morning when chloroform is used, while the moths will all be dead in a trap charged with tetrachloride.

Calcium cyanide (granular) is very useful in permanent light traps. About a half inch of the material is placed in the bottom of the trap and covered with several layers of blotting paper. The addition of a few c. c. of water to the blotters in the evening produces a steady evolution of cyanogen gas during the night. This is best used with the addition of chloroform or carbon tetrachloride as an anaesthetic agent, as it is relatively slower to kill. The cyanide is easily replaced when exhausted, and is inexpensive.

#### NOTES ON THE MOSQUITOES OF THE OTTAWA DISTRICT.

BY C. R. TWINN,

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The following brief account of the mosquitoes of the Ottawa district is based on the results of a study of the mosquito fauna carried out during 1924 and 1925 with the permission of the Dominion Entomologist. A total of twenty-three species, representing seven genera, including *Aedes*, *Culex*, *Mansonia*, *Anopheles*, *Wyeomyia*, *Corethra* and *Chaoborus* were taken, several of the species being recorded from the district for the first time.

The most troublesome mosquitoes belong to the genus *Aedes*, and develop in early spring from overwintering eggs, in shallow temporary bodies of water rich in organic matter, algae and aquatic animal life. These mosquitoes are annually troublesome in many sections of the district late in May, June and July, the severity and extent of the pest fluctuating from year to year. Northern and eastern sections of Ottawa are particularly subject to mosquito outbreak, and beautiful Rockcliffe Park is frequently almost untenable during the best season of the year. Across the Ottawa river in Quebec, the people of Gatineau Point suffer severe discomfort, and the summer cottages remain largely unoccupied during the period of mosquito abundance.

The largest and most prolific breeding area, from which issue countless numbers of mosquitoes, lies to the north of Ottawa, at Gatineau Point, Que., a short distance across the Ottawa river from Rockcliffe Park. This area which consists of two or three hundred acres of low-lying woodland and marshy meadows, is flooded every spring by the Ottawa river, during April and May. The flooding occurs in greatest volume in normal years, through the bed of a small nameless stream which opens into the river opposite the western extremity of Kettle Island, but in exceptional seasons the river rises sufficiently high to flow completely over the spit of land which constitutes Gatineau Point, sometimes reaching almost to the ground floors of some of the dwellings. A smaller area on the same side of the river occurs a short distance from Gatineau Point, near

Leamy's Creek, and consists of temporary pools in open woodland.

The severity of the pest developing in this locality depends very largely on the extent and duration of the river freshet which, in turn, is regulated by the amount of winter snowfall and early spring rains. In 1924, which was a bad mosquito year, the Ottawa river continued to rise from early April to late in May, reaching a maximum height of over 144 feet above sea-level. After this date it fell rapidly, the water on the flooded land fast receding until by the end of June, the area had largely returned to its normal condition. Owing to this gradual rise of the river the overwintering mosquito eggs were submerged at different times so that adults were emerging over a long period and, as a very considerable area was inundated, a rather bad outbreak developed.

In 1925, mosquitoes were decidedly less troublesome than in 1924. This is directly attributable to the river levels at freshet time, which owing to the light snowfall in the winter of 1924-25, and the subsequent dry weather of early spring, were four feet lower at their highest point than in 1924, and quickly returned to normal. The area flooded was consequently considerably smaller than in 1924 and rapidly dried up, resulting in comparatively negligible numbers of mosquitoes developing.

In Ottawa, the breeding areas are small in comparison with those at Gatineau Point, but they are large enough to produce great numbers of mosquitoes. They consist of bodies of water of a more or less temporary nature, in various parts of the city, principally in outlying sections. Near Rockcliffe, in the vicinity of Beechwood Cemetery, there is a considerable acreage covered by transient leafy pools which serve as a prolific source of mosquitoes. Near Hurdman's Bridge and in Ottawa South there are several acres of swampy meadows and scrubby woodland flooded in spring by the Rideau river which produce mosquitoes in considerable numbers. These are the principal areas, but in addition there are many small temporary mosquito-breeding pools scattered about the city in a variety of situations.

During the period covered by this survey fourteen species of *Aedes* were taken in Ottawa and Gatineau Point, Que. Collections of several of the species were also taken at various points outside of Ottawa not recorded here.

The following species were taken in Ottawa: *Aedes stimulans* Walker, *A. cinereoborealis* Felt & Young, *A. canadensis* Theobald, *A. fitchii* F. & Y., *A. excrucians* Walk., *A. impiger* Walk., *A. intrudens* Dyar, *A. cinereus* Meigen, *A. laearensis* F. & Y., *A. hirsuteron* Theo., *A. vexans* Meig., *A. punctor* Kirby, (adult females only) *A. abserratus* F. & Y., and *A. triseriatus* Say.

Those occurring in Gatineau Point are *Aedes hirsuteron*, *A. stimulans*, *A. vexans*, and *A. cinereus*.

*Aedes stimulans* Walk., and *A. hirsuteron* Theo., are the dominant species, the former in Ottawa and the latter in Gatineau Point. The remaining species, with the exception of *A. abserratus* F. & Y., and *A. triseriatus* Say, are common in the district and more or less troublesome owing to their bloodsucking habits. *Aedes abserratus*\* and *A. triseriatus* are apparently rare. One small larval

\*—My thanks are due to Professor Robert Matheson of Cornell who kindly verified my determination of this species.



collection of the former was taken on May 1st, 1924, in a shallow temporary pool on a swampy woodland wagon track in Ottawa, and one larva of the latter on August 27th, 1924, in a water-barrel where it was associated with larvae of *Culex territans* Walker. A female adult of *A. triseriatus* was also captured at Aylmer, Que., on Sept. 16th, 1925, by Mr. C. E. Yauch.

*Aedes stimulans* Walker, is the most prevalent species in the district and occurs in all the principal breeding areas associated with various other species. The larvae commence hatching from overwintering eggs early in April, the majority reaching maturity in late April and early May. They occur so numerous in some pools that hundreds may be secured with one or two sweeps of a small wire-mesh strainer. Pupation commences at the end of April and is general by the middle of May. The earliest adults emerge about May 10th, the maximum emergence occurring in the latter part of the month, and slackening off towards the middle of June. This species is commonly active during the daytime as well as at dusk, and is a persistent biter. It is most troublesome in late May and early June, but can frequently be taken late in July. It occurs most abundantly in the vicinity of its breeding grounds, but will migrate a distance of at least a mile presumably in search of blood.

*Aedes hirsuteron* Theobald develops almost exclusively in the Gatineau Point area, inundated in early spring by the Ottawa river. It occurs in great numbers in association with *A. stimulans*, *A. vexans* and *A. cinereus*. Egg-hatching commences early in April and may continue over a period of two or three weeks depending on the extent and duration of the river freshet. The majority of the larvae pupate before the end of May, the adults commencing to emerge during the latter part of the month and appearing in greatest numbers in early June. They rest during the daytime in lank grass and tangled underbrush, but will attack an intruder in hordes, and bite viciously. Their numbers diminish rapidly during the early part of July. This species will migrate short distances, numbers being taken in Ottawa, one or two miles from its breeding grounds, where it is no doubt responsible for much of the discomfort experienced by people in the Rockcliffe, Eastview and New Edinburgh sections.

Of the remaining genera represented in the district, *Culex* is the most important. Three species of this genus were found, of which two, *Culex pipiens* Linn., and *C. territans* Walker, are common, and the third, *Culex testaceus* v. d. Wulp, is apparently rare. Domestic water-barrels, of which, fortunately, there are not a great number in Ottawa; and water barrels used on railway bridges, were found to contain all stages of *Culex pipiens* and *C. territans* when examined during the latter part of August, 1924. Adults of *Culex pipiens*, which is the dominant species, were frequently taken indoors at various times of the year. Hibernating adults were often netted in the cellar during the winter months and in early spring. They are nocturnal in habits and sometimes become troublesome in bedrooms.

The only specimen of *Culex testaceus* v. d. Wulp captured was a female, netted in Ottawa South, May 18, 1924.

Anopheline mosquitoes are comparatively rare in the district, only one species, *Anopheles maculipennis* Meigen, being taken during the period of this

survey. Three female specimens were secured, one on April 28, 1924, in the cellar of a house in Ottawa South, and the others on April 23, 1925, at Gatineau Point, Que., on the verandah of a deserted summer cottage. On both occasions they were captured attempting to secure a blood meal.

The genus *Mansonia* is represented in Ottawa by one species, *Mansonia perturbans* Walker. Several female specimens were taken in late June and early July, 1925, in the vicinity of swampy situations and in the bedroom of a house. It is fortunate that this species is not abundant in Ottawa as the female, which is crepuscular, inflicts a very painful bite.

Larvae of the pitcher plant mosquito, *Wyeomyia smithii* (Coq.) Felt, were taken abundantly on May 29, 1925, in pitcher plants, *Sarracenia purpurea* in the extensive sphagnum bog at Mer Bleue near Carlsbad Springs. They feed upon the decaying remains of insects trapped in the water contained in the plants. Reared adults emerged in mid-June.

The remaining three species found in the district belong to the mosquito sub-family *Chaoborinae*. They are of interest in that the larvae are predacious and the adults which have a very short proboscis, do not bite. The species taken are *Corethra cinctipes* Coquillett, *C. culiciformis* DeGeer, and *Chaoborus punctipennis* Say.

The larvae of *Corethra* breed in temporary pools in early spring associated with *Aedes* larvae, on which they prey. They differ markedly in appearance from other mosquito larvae, the body possessing four air sacs, one pair in the enlarged thorax and the other pair posteriorly in the abdomen. The antennae and mouth-parts are modified for a predacious mode of life and the body is semi-transparent rendering it difficult of detection. Larvae of *Corethra cinctipes*, which is the most abundant species, were first taken on May 5, 1924, at Gatineau Point, Que., adults emerging on June 4. In 1925, great numbers of larvae were found in the same locality, late in April, associated with *Aedes hirsuteron*.

The predacious habits of this species were demonstrated when some of the larvae placed in a rearing jar containing *Aedes* larvae destroyed several of the latter leaving only the chitinous parts intact. They also devoured one another with equal facility.

Larvae of *Corethra culiciformis* DeG., were found in small numbers at Gatineau Point on May 5, 1924, and again in May, 1925, in association with *C. cinctipes*. Adults emerged from the former collection, on June 7 and from the latter, late in May.

Male specimens of *Chaoborus punctipennis* Say were taken at Ottawa South on July 7 and July 24, 1925. They were hovering in small swarms at dusk, six or seven feet from the ground, over a pathway through scrubby woodland.

#### NOTES ON WIEDEMANN'S TYPES OF SYRPHIDAE (DIPT.).\*

BY C. H. CURRAN,  
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Through the courtesy of Dr. Hans Zerny of the Naturhistorisches Museum, Vienna, it has been possible to examine a number of types of Diptera described

\*—Contribution from the Division of Systematic Entomology, Entomological Branch, Dept. of Agric., Ottawa.

by C. R. W. Wiedemann. In addition to the species described by that author, several Fabrician species determined by Wiedemann have been studied. As Wiedemann evidently examined many of Fabricius' types, it is reasonable to suppose that these determinations are accurate, at least in almost all cases.

One result of the examination of the species belonging to several genera will be noted in changes of names of a few species and the disposition of some well-known names in the synonymy. Such names as *Allograpta fracta* and *Baccha tarchetius* Walk., give way to older names. It is unfortunate that these changes are necessary but at the same time it is well that they can be made with the assurance that the synonymy is accurate. It does not seem at all likely that older names will be found for the species so far examined and this is reason for some gratification.

In the near future it is hoped to continue the study of the types until all those available have been reported upon. Where the descriptions give all the important details, or the species has been redescribed in detail by Williston or others, this fact has been noted.

#### **Epistrophe nectarinus** Wiedemann.

*Syrphus nectarinus* Wiedemann, Auss. Zweifl., II, 128, 1830.

This has been considered a synonym of *balteatus* Deg., but apparently is a good species. In *nectarinus* the posterior femur of the female is beset with black spinules on the apical third or more and the apical third or more of the last three abdominal sternites is black pilose. In *balteatus* the black spinules are limited to the apical fourth or less and the apical sternites bear a basal, longitudinal triangle of black pile. In *nectarinus* the genital claspers are shorter and more tapering. The species is known only from China.

#### **Epistrophe viridaureus** Wiedemann.

*Syrphus viridaureus* Wiedemann, Anal. Ent., 35, 1824.

*Syrphus alternans* Macq., Dipt. Exot., II (2), 89, 1842.

The type is a male, which is rather discolored. This form is identical with what has been known as the variety or species *alternans* Macq. The front of the male and scutellum is wholly pale yellow pilose, the front in the female is black pilose on upper third or less except the vertex. The pile of the venter is as in *nectarinus*. Widely distributed in Oriental Region.

#### **Allograpta exotica** Wiedemann.

*Syrphus exoticus* Wiedemann, Auss. Zweifl., II, 136, 1830.

*Allograpta fracta* O.S., West Dipt., 31, 1877.

*Syrphus exoticus* Wiedemann, from Brazil, is without doubt, the same as *Allograpta fracta* O. S. The type male (*exotica*) has a wider black facial stripe than is usually found in *fracta*, but some specimens of the latter, notably a male from Argentina, are intermediate in this respect. The type female of *exotica* is quite like females of *fracta* in the Canadian National Collection, but the male has the first abdominal segment more as in *obliqua* Say.

These two species are easily distinguished. In *obliqua* the yellow of the sternopleura is broadly connected with the yellow of the metapleura by a spot extending across the middle of the pteropleura while in *exotica* the pteropleura is wholly bronze black. *Allograpta exotica* ranges from Texas and California to Argentina. The range of *Allograpta obliqua* is even greater as there are



specimens before me from Manitoba, Eastern Canada and Argentina; it is not, apparently, found in more tropical regions.

***Baccha (Ocyptamus) conjunctus* Wiedemann.**

*Syrphus conjunctus* Wied., Auss. Zweifl., II, 116, 1830.

The specimen in the Vienna Museum is a male without head. Wiedemann does not mention a specimen in the Winthem collection so there may be some doubt about this specimen being of the type series. The abdomen is dull rusty yellow with the incisure between the first two segments black, followed by a broad white, interrupted fascia, the apices of the segments forming with the anterior corners of the following segment, yellow, slightly arched fasciae. The mesonotum is shining black with the broad lateral margin yellowish, the disc with a slender, posteriorly broadened entire median vitta and a pair of moderately wide sub-median vittae which are slightly narrowed and divergent posteriorly, ochreous pollinose and not quite reaching the anterior and posterior margins, but connected along the suture with the yellow lateral margins. Wings yellowish brown in front of the third vein, in the first basal cell except apically and along the spurious vein. Scutellum pale yellow at base and margin. Known only from Brazil.

***Baccha (Ocyptamus) trigona* Wiedemann.**

*Syrphus trigonus* Wiedmann, Aus. Zweifl., II, 126, 1830.

The description is quite sufficient to enable identification. The species is widespread in the Neotropical Region.

***Baccha (Ocyptamus) clarapex* Wiedemann.**

*Syrphus clarapex* Wiedemann, Auss. Zweifl., II, 124, 1830.

Wiedemann's description is quite clear and identification not at all difficult. The type lacks its head and the wings are somewhat folded. Not uncommon in tropical South America.

***Baccha fusciventris* Wiedemann.**

*Baccha fusciventris* Wied., Auss. Zweifl., II, 95, 1830.

This species is based on a rather discolored specimen of *Baccha clavata* Fabr. Its origin is not known.

***Baccha fascipennis* Wiedemann.**

*Baccha fascipennis* Wied., Aus., Zweifl., II, 96, 1830.

The type is a female lacking its head but otherwise in good condition.

***Baccha costalis* Wiedemann.**

*Baccha costalis* Wied., Auss. Zweifl., II, 97, 1830.

*Baccha tarchetius* Walker, List III, 549, 1849.

The type of *Baccha costalis* Wiedemann is in fairly good condition although apparently somewhat teneral or faded. While the color is distinctly paler than in *tarchetius* Walker as represented in the Canadian National Collection there cannot be the slightest doubt about the synonymy. In the type of *costalis* the anterior border of the wing is broadly pale yellowish brown, exactly as the darker brown pattern of *tarchetius*. The steel-blue portions of the abdomen are not well marked except on the apical segment, but they may be made out. The type locality of this species is not known, but it probably came from Georgia.

***Mesogramma tibicen* Wiedemann.**

*Syrphus tibicen* Wied., Auss. Zweifl., II, 127, 1830.

Readily recognized from the description. The third to fifth segments

each bear a pair of "powder-horn" shaped yellow spots, the posterior narrow ends curving inwards so as to enclose a roundish black spot which is incompletely, longitudinally bisected by a yellow line. Occurs in Brazil.

**Mesogramma musicus** Fabricius.

*Scaeva musicus* Fabr., Syst. Antl., 253, 1805.

*Syrphus musicus* Wied., Auss. Zweifl., II, 143, 1830.

Easily recognized from Wiedemann's description. The third and fourth segments each bear a moderately broad median vitta, limited by a black stripe on either side, the basal two-thirds of the segments being yellow and bearing a small *longitudinal* (not oblique) black spot towards either side; the black of the hind margin is produced forward laterally as a broad angle. There is a faint brownish preapical band on the hind femora. Occurs in tropical South America, but not common.

**Mesogramma duplicata** Wiedemann.

*Syrphus duplicatus* Wiedemann, Auss. Zweifl., II, 142, 1830.

The description is quite sufficient for determination. Common and widespread in Neotropical region.

**Chrysogaster nitida** Wiedemann.

*Chrysogaster nitidus* Wied., Auss. Zweifl., II, 116, 1830.

Two females are in the collection and are in excellent condition. The species has been correctly identified by Williston.

**Cynorhina notata** Wiedemann.

*Milesia notata* Wiedemann, Auss. Zweifl., II, 109, 1830.

The types examined include a male and female, one of which is labelled "Savanah." These trace out to *notata* in my key, (Can. Ent. LVI), although the mesonotum is only obscurely yellow behind the wing root, the posterior calli being yellowish. The basal half of the scutellum is blackish, the remainder yellowish.

**Xylota vagans** Wiedemann.

*Xylota vagans* Wied., Auss., Zweifl., II, 101, 1830.

The type, a female, has been wet. I have specimens from British Guiana which are identical in all respects. The type is from Brazil. The species is being redescribed in a paper under preparation.

**Xylota metallica** Wiedemann.

*Xylota metallica* Wied., Auss. Zweifl., II, 102, 1830.

*Xylota subtropica* Curran, Can. Ent., LVII, 44, 1925.

The type is a little more robust than my specimens of *subtropica*, but undoubtedly they are the same species. In the Vienna Museum is a specimen from Pennsylvania labelled "eiuncida Say." This is the female of *metallica* and agrees in all respects. The posterior femora are blackish on a little more than the apical half and the abdominal spots do not reach the lateral margins, being more as in *Xylota fraudulosa* Loew, but less sharply defined.

**Xylota chalybea** Wiedemann.

*Xylota chalybea* Wied., Auss. Zweifl., II, 98, 1830.

The type is in poor condition, having lost its head and the body has been slightly stained. There can be no doubt about specimens from Ontario being identical, and the species has been correctly determined in North America.

**Eumerus** Meig.

Several of the Oriental forms have been confused and *E. splendens* has

been placed as a synonym of *aurifrons*. The following synopsis will serve to distinguish the species related to *aurifrons* Wied. The types of *aurifrons* and *splendens* have been examined and appear to represent two distinct species.

1. Posterior tibiae largely black pilose apically, in male at least on the inner (posterior) side before the apex there are many black hairs and the posterior tarsi are greatly widened and flattened on all but the basal joint ..... *aurifrons* Wd.  
Posterior tibiae of both sexes wholly pale pilose ..... 2.
2. Eyes of male contiguous; tarsi wholly pale, the posterior basitarsi reddish above ..... *macrocerus* Wd.  
Eyes of male (separated? as in *aurifrons*); posterior basitarsi usually brown, tibiae without broad, complete apical bands of brown ..... 3.
3. Abdomen entirely bright yellow pilose (male) ..... *deceptor* Curran.  
Abdomen largely dark pilose ..... 4.
4. Pollen on lunules yellowish white, pile short (female) .... *splendens* Wd.  
Pollen on lunules bright yellow; pile long, erect (female) *deceptor* Curran.

#### NEW SPIDERS FROM CANADA AND THE ADJOINING STATES, No. 5.

BY J. H. EMERTON,  
Boston, Mass.

The following spiders have come from various sources within the last two years. The new *Theridion* and the *Pellenes* are very distinct species found on the north shore of the Gulf of St. Lawrence by the late F. W. Waugh. The *Grammonota* is a small and inconspicuous species that has probably been confused with the more common *ornata* and *pictilis*. The *Lepthyphantes simplex* is a common and widely distributed species related to *Lepthyphantes* (*Bathypantes*) *angulata* Em. and *inornata* Bks. and *unimaculata* Bks. The other two *Lepthyphantes* belong to the same series as *subalpina* and *uplicata* with large and complicated tarsal hooks on the male palpi.

#### *Theridion simulatum* n. sp.

This resembles *T. montanum* but is a little smaller and has more slender legs. The color is redder than in *montanum*, the males approaching the color of *T. differens*. The middle stripe of the cephalothorax is narrower, widening

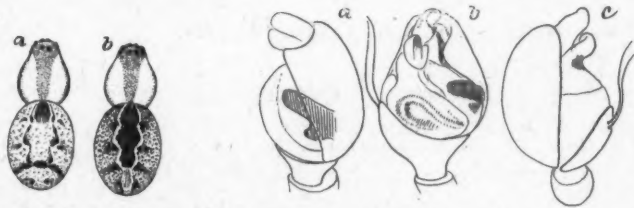


Fig. 1.—*Theridion simulatum*, dorsal markings of female.

Fig. 2.—*Theridion simulatum*, palpi of male.

more abruptly toward the eyes. The middle stripe of the abdomen has the front three segments distinctly separated from the others. In some females and most males the front three segments are dark colored and darkest at the posterior end, which in some cases joins with the two lateral black spots to form a dark line across the abdomen. (Fig. 1.)

The male palpus resembles closely that of *T. montanum*, but the hard lunate process on the under side of the palpal organ is not more than half as large as in *montanum* and the two soft appendages at the distal end are much larger. (Fig. 2, a, b, c.).

Seven Islands, Quebec, F. W. Waugh, June, 1924.

***Nesticus cellulanus* Clerck.**

A male of this common European species was found in a house at Weymouth, Nova Scotia, by Miss E. B. Bryant of Boston, August, 1924.

The peculiar complicated male palpus is shown in Fig. 3.

***Ceratinella (Ceraticelus) ornatulus* Crosby.**

New York Sta. Mus. Bull. No. 264, June, 1925.

This species which has only lately been described was first found in the Adirondacks of New York State and later by F. W. Waugh at Seven Islands Quebec. It resembles *C. brunnea* of the White Mountains, having the same gray abdomen with a round spot on the back which in the female is about

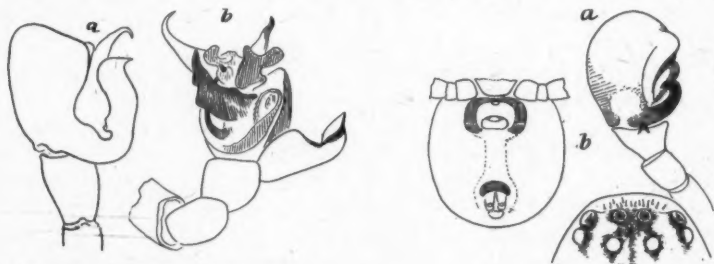


Fig. 3.—*Nesticus cellulanus*, palpus of male.

Fig. 4.—*Ceratinella ornatula*, a. head and palpus of male, b. ventral side of abdomen of female. half the diameter of the abdomen. The cephalothorax is lighter in color than in *brunnea* and yellow like the legs. The male palpus has a very short and blunt process on the upper side of the tibia. (Fig. 4, a.). The epigynum is somewhat shorter and wider than in *brunnea* and the hard plate in front of the spinnerets is smaller. (Fig. 4, b.)

***Lophocarenum vaccinii* n. sp.**

Male, 2 mm. long, with the head only slightly elevated and the pits very small and close behind the eyes. (Fig. 5, a, b.). The cephalothorax is chestnut brown, the legs lighter brown, and the abdomen gray.

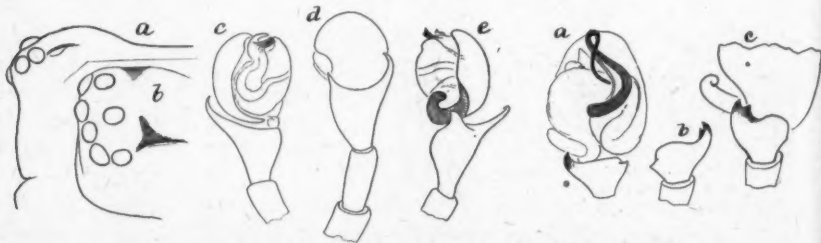


Fig. 5.—*Lophocarenum vaccinii*, a. b. head of male, c. d. e. palpus of male.

Fig. 6.—*Grammonota bidentata*, a, b, c. palpus of male.

The male palpus (Fig. 5, c., d., e.) has the tibia widened at the end so that it is about as wide as long. On the upper side is a long slender hook ex-

tending over the tarsus and on the outer side is a shorter hook flattened at the side. The parts of the palpal organ are very short and show as two small processes, one hard and black and the other pale and more slender. (Fig. 5, c, e.).

One male only in dead leaves under blueberry bushes at Holliston, Mass.

***Grammonota bidentata* n. sp.**

2 mm. long and resembling *G. ornata*. Cephalothorax brown. Abdomen with distinct and light markings.

The male palpus has the tibia somewhat widened on the outer side where there is a short process ending in two teeth directed forward. On the inner side of the tibia is a short sharp process. (Fig. 6, a., b., c.). The palpal organ is of the usual form in the genus with the tube slender and turned backward half the length of the tarsus. (Fig. 6, a.).

Holliston, Mass. and Sharon, Mass. Immature specimens of both sexes and freshly molted males in May.

***Lepthyphantes simplex* n. sp.**

A small slender species 2 mm. long or less, resembling *Bathyphantes angulata* Em. with which it has been confused, and also resembling closely *B. inornata* and *B. unimaculata* Banks. The cephalothorax and abdomen are black. The legs are pale except the femora of the first and second pairs, which usually have a little black at the base which sometimes extends over the whole joint and even to the femora of the third and fourth pairs. The palpi are black in both sexes. The mandibles of the male are not enlarged at the base as in some related species. The male palpus has the tarsus only slightly angular on the upper side. The tarsal hook is large and flat and resembles that of *micaria* and *angulata* (Fig. 7, a., b., c.).

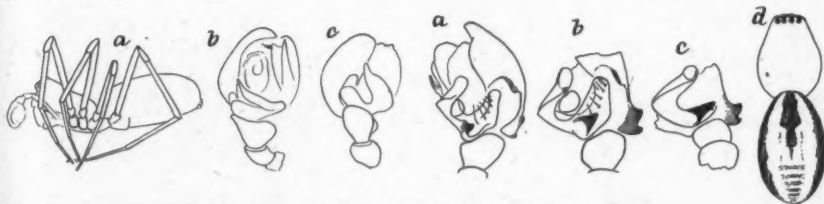


Fig. 7.—*Lepthyphantes simplex*, a. outline of male, b. c. palpus of male.

Fig. 8.—*Lepthyphantes rubescens*, a. b. c. palpus of male showing the tarsal hook in different positions, d. dorsal markings.

Found at many places in sweeping low plants, lately at Holliston, Mass. and Weymouth, N.S.

***Lepthyphantes rubescens* n. sp.**

This is another species of the same series with *duplicatus* and *furcatus*. The specimen which is perhaps a small one is 2.5 mm. long. The legs and cephalothorax are pale dull yellow and the abdomen is marked with pinkish gray as in *Linyphia phrygiana* and *diana* on a pale ground. There is a middle stripe of three segments on the front half of the abdomen and on the hinder half pale transverse lines. The sides are marked with gray. (Fig. 8, a.). As in the other species, the most distinguishing characters are in the male palpi. At the base of the tarsus is a process somewhat like that in *duplicatus* with two short points slightly curved and turned forward. (Fig. 8, a., b., c.). The tarsal hook has the middle tooth unusually long and dark colored. (Fig. 8, b., c.). The mandibles



are slightly thickened at the base and have on the outer side for half their length fine parallel transverse ridges.

Masset, Queen Charlotte Is., C. Patch, 1919, in the collection of F. W. Waugh.

***Lepthyphantes rainieri* n. sp.**

10 mm. long, resembling, in size and color, *L. subalpina*, *duplicata* and *calcarata*.

The male palpus has the tarsal hook unusually large, especially at the base where it extends beyond the tibia. The usual middle tooth is correspondingly enlarged. (Fig. 9, a, b.).

The female taken with the male and supposed to be the same species has the epigynum small and inconspicuous. (Fig. 9, c.).

Mt. Rainier, Paradise Park, July 20, 1905.

***Pellenes waughii* n. sp.**

Immature female, 7 mm. long, marked with black and white with faint orange brown on the head and legs.

The head between the eyes is white, with a few pale orange brown scales, and this white area extends backward at the sides half the length of the thorax. From the dorsal pit backward there is an irregular white middle stripe. The abdomen is white in front and there is a broken middle line of white spots narrowing toward the spinnerets. At the sides are several oblique white stripes

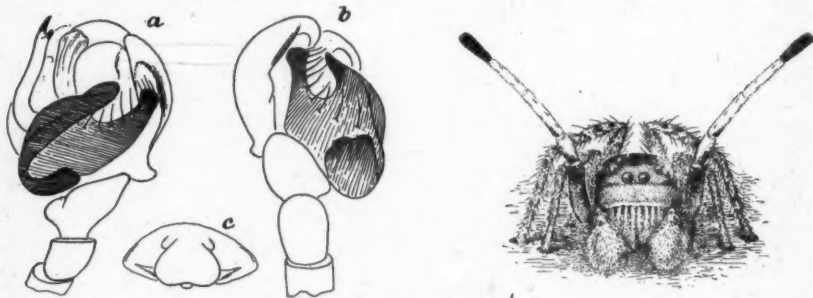


Fig. 9.—*Lepthyphantes rainieri*, a. b. palpus of male showing the large tarsal hook, c. epigynum. Fig. 10.—*Pellenes waughii*, male seen from in front.

approaching the middle spots. The front of the head below the eyes is white. The under side, including the coxae, is pale with a few small dark spots on the sternum and abdomen. The legs are marked above with irregular dark spots and covered with white or grayish hairs. (Fig. 11, a.).

In the male, which is nearly the same size, the dorsal white markings are much reduced and the cephalothorax is black except very narrow white lines along the edges and a few white and reddish hairs toward the front merging with the bright red hairs around the front middle eyes. On the back of the abdomen the middle stripe is reduced to two or three small white spots at the posterior end and the lateral oblique stripes are very small. (Fig. 11, b.).

The display colors and markings are mainly on the face and front legs. The front middle eyes are surrounded by bright red hairs which extend at the sides under the lateral eyes. (Fig. 10.). Below the eyes is a pale band the whole

width of the face, slightly tinged with yellow and between this and the mandibles a narrow white band. The mandibles are marked for two-thirds their length with vertical ridges of yellow hairs. In front of the mandibles and usually partly concealing them are carried the palpi thickly covered with long white and yellowish hairs.

The femora of the front legs are black toward the end and on the inner side where there is a narrow bright white line. On the outer side of the end of the femur is a tuft of stiff black hairs. The under side of the patella, tibia and metatarsus is pale with only very short hairs and spines and the tarsus is deep black with short black hairs. On the outer side of the patella and at the base of the metatarsus are black spots.

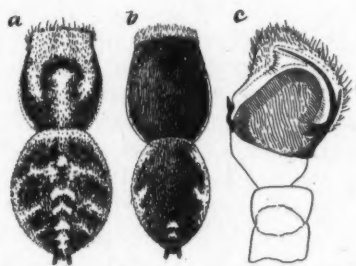


Fig. 11.—*Pellenes waughii*, a. dorsal markings of female, b. dorsal markings of male, c. palpus of male.

The third legs, as far as they can be seen from in front over the head, are strongly marked with dark spots, though not modified in form. Near the base of the patella is a small spot in the place of the eye spot of *P. viridipes* and *calcaratus*. (Fig. 10.). The male palpus (Fig. 11, c.) differs little from that of other species of the genus.

Seven Islands, Quebec, F. W. Waugh, August, 1924.

#### NOTES ON THE SPECIES OF THE GENUS XANTHOTYPE (LEPID.).\*

BY J. MCDUNNOUGH,  
Ottawa, Ont.

In "The Lepidopterist," Vol. II, p. 38 (1918) Mr. L. W. Swett commenced an article entitled "Xanthotype crocataria Fabr. with descriptions of new species" which was continued on pp. 41, 73 & 86 of the same journal and then suddenly stopped; with the second instalment of this paper two colored plates were issued (Plates VII & VIII) figuring a number of apparently new species. Owing to the non-completion of Mr. Swett's paper several new names are based on these figures alone; in a group where, as Mr. Swett himself says, the markings are practically alike in all species and specific distinctions must be sought in the male genitalia this is unfortunate and is rendered doubly so by the poor condition of many of the specimens figured and the unsatisfactory quality of the reproductions. The one saving feature is that Mr. Swett has given on the plates exact localities for each specimen figured; this, combined with the fact that, at the time the article was discontinued, only one group (according to genitalia) remained to

\*—Contribution from the Division of Systematic Entomology, Entomological Branch, Dept. of Agric., Ottawa, Ont.

be discussed, enables us to tie down the names based on figures alone with a certain amount of accuracy.

A revision of our Canadian species of the genus *Xanthotype* has led to a critical study of Mr. Swett's work and to the following specific notes. At the outset I may say that Mr. Swett's differentiation into two groups—the one with a bulbous kite-shaped oedoeagus and the other with a narrow organ with the lateral edges bluntly pointed apically—is an excellent one; the feature can be generally accurately determined by the removal of a few scales from the apex of the male abdomen and an examination of the genitalia *in situ*.

In the commencement of his paper Mr. Swett discusses the identity of *crocataria* Fabr. and limits the name to an Atlantic Coast form with kite-shaped oedoeagus, making *citrinaria* Hbn. and *caelaria* Hlst. synonyms; with this synonymy I shall agree although I would point out that both the size and the deep yellow color in Hubner's figure of *citrinaria* (I have Kirby's facsimile edition only before me) rather favor a female of the narrow oedoeagus group; however, as the coloration may be faulty in the edition before me, I refrain from any change of Mr. Swett's synonymy. I much fear, however, that the name *crocataria* Fabr. will have to fall to the earlier one *sospeta* Drury (1773, Ill. Nat. Hist. II, 38, Pl. XXII, fig. 3). Drury's name was based on a female from Dr. Fothergill's collection, ostensibly from Jamaica. Rothschild and Jordan (1903, Rev. Sphingidae, pp. 89, 327) have, however, shown that several of the species from this collection, stated as occurring in Jamaica, were in reality from New York, and I imagine that the present case is a similar one; Mr. W. Gowdey, Govt. Entomologist for Jamaica, writes me that the species is omitted from the list of Jamaican insects he is preparing as the locality is probably erroneous. Drury's figure, while rather crude, very evidently represents the large pale-colored female of *crocataria* Fabr. as limited by Swett. This species is quite common in the Ottawa and Eastern Ontario regions and several slides of male genitalia which I have made agree well with Swett's figures (op. cit. pp. 73 & 74). On p. 78 Swett describes as a new species, *Xanthotype manitobensis*, from a single male from Aweme, Man., which is also figured on Plate VIII, fig. II. There is a good series from the type locality in the Canadian National Collection; a study of the male genitalia convinces me that the points of distinction stressed by Swett (size of ampullae, ceros and harpe) do not hold good as specific characters, a series of slides showing much variability in this respect. The paucity of maculation as compared with eastern specimens can also not be considered of specific value; many specimens do show, it is true, a reduction of the spotting but specimens occur which are fully as well marked as our Ottawa specimens. The name *manitobensis* might, for the present, be held for a doubtful western race of *sospeta* which, according to our material, extends from Manitoba through Saskatchewan into Alberta; specimens from Nepigon, Sudbury and Larder Lake, Ont., link it up with the east and I can point to no characters, either in maculation or genitalia, which would sharply define it. *Attenuaria* Swett (op. cit. p. 79) and *rufaria* Swett (p. 88), described respectively from Texas and Florida, seem to be good species; the latter is certainly distinct.

These conclude the species definitely described by Mr. Swett and we now consider those of which there are figures only and which, from the

concluding statements (p. 90), evidently belong to the group with narrow oedoeagus. Figures 4 and 5 of Plate VII depict the male holotype and female allotype of *Xanthotype urticaria* Swett from Nova Scotia. I have before me four males and one female from Barrington Passage, N.S., in the Canadian National Collection and a similar pair loaned me by Mr. S. Cassino from Dublin Shore, N.S., which not only agree in genitalia with Swett's grouping but also match the figures quite closely. The species is a valid one and, as compared with *sospeta*, is a much deeper orange-yellow in color in both sexes with the dark bands generally better defined and more purple-brown in color rather than liver-brown. Figure 6 of the same Plate is designated *urticaria* form *watsoni* Swett from Newfoundland. I have no material from this region and as the figure is very poor cannot well distinguish wherein the difference between the two forms lies; it would seem as if *watsoni* showed more heavy spotting but I doubt if this is more than individual. Specimens from the Ottawa and Muskoka regions, where *urticaria* is quite common, show generally much heavier spotting than in the nymotypical form but intergrades occur which make it inadvisable, to my mind, to apply any form or racial name to specimens from this section of Canada. As we go further west the color of the species becomes paler; in Manitoba the color of the females is about the same as that of *sospeta* males and the heavy spotting disappears, the dark bands showing very prominently. In Alberta the yellow is still duller and there is considerable tendency towards a reduction of the large spots. I have made a number of slides of the male genitalia of specimens from all the provinces mentioned above and can find nothing that would warrant the supposition that we are dealing with more than a single rather variable species; slight differences in the lengths of the cercos, harpe and ampulla are noticeable but these occur just as commonly among specimens from the same locality and cannot be considered as either of specific or racial value. On Plate VIII Swett figures (fig. 12) *Xanthotype vagaria* variety, from New Washington, Pa., and (figs. 14, 15) *vagaria* var. *turbidaria* from Colorado. The name *vagaria* is a *nomen nudum* and cannot be based on the New Washington variety, according to the current rules of nomenclature. For the Colorado specimens the name *turbidaria* may be used, but I question whether these represent anything more than a doubtful race of *urticaria*. Through the kindness of Mr. Cassino I have examined the genitalia of a male from Plainview, Colorado, which agrees quite closely with fig. 14 in maculation and can find no essential differences in the genitalia from those of *urticaria*. As figured, *turbidaria* represents the extreme point of reduction of the brown maculation, being almost unicolorous dull yellow; I doubt, however, whether this is constant even in Colorado, and should feel inclined to apply the name to the western race of *urticaria* which occurs apparently throughout the Rocky Mountain foothills in a more or less variable condition. Of *Xanthotype barnesi* Swett (Pl. VIII, figs. 10, 13) from Plumas Co., Calif., I can say nothing as I have examined no material from this region.

To sum up I find that in Canada, at least, as far as can be judged by the material in our National Collection, we have only two variable species belonging to the genus *Xanthotype*; these species may best be separated by the form of the male genitalia, especially the oedoeagus, but the depth of the yellow coloration is also of considerable value in making determinations.

A PRELIMINARY REVISION OF THE CAMPOPLEGINAE IN THE  
CANADIAN NATIONAL COLLECTION, OTTAWA.

BY HENRY L. VIERECK,

Ottawa, Ont.

(Continued from page 78).

**Sagaritis aequalis** n. sp.Related to *S. striatipes* Ashm.

Agrees with the original description of *S. tibiator* Cresson except as follows. Areolet not minute and the mid proximal trochanters partly black.

*Female*. Length, 6 mm.; black, antennae black throughout, mandibles mostly yellow, palpi dull stramineous, tegulae yellow with a transparent margin, coxae black, proximal trochanters black with a yellowish, stramineous, apical margin, distal trochanters yellowish excepting the hind pair which is yellowish and blackish, femora more or less reddish stramineous, black at base, the fore femora black only at base of the flexor surface, fore tibiae stramineous, flexor surface of mid tibiae reddish stramineous, their extensor surface yellowish at base and in the middle, blackish near base and at apex, hind tibiae colored like the mid-tibiae but darker, fore and mid tarsi brownish, hind tarsi blackish, the basi-tarsi pale at base, abdomen black, apical margin of tergites obscurely reddish stramineous or blackish stramineous, plica yellow; areola poorly defined, weakly separated from the petiolarea, wider than long, truncate at base, finely sculptured, the petiolarea transversely costate; sheaths of the ovipositor apparently twice as long as the apical truncature of the abdomen.

*Male*. Characters essentially as in the female but differing notably as follows. Fore and mid coxae yellowish beneath, fore and mid proximal trochanters yellow beneath, fore femora not at all black, extensor surface of fore tibiae, whitish, mid tibiae blackish with the extensor surface whitish at base and in the middle, hind tibiae colored like the mid tibiae, abdomen black or blackish throughout excepting the yellowish plica; areola defined only at base and between the base and the costulae.

*Holotype*—♀, Oliver, B. C., May 16, 1923, (C. B. Garrett); No. 1656 in the Canadian National Collection, Ottawa.

*Allotype*—♂, with data as in the holotype but collected May 24.

*Paratypes*—♀ ♀, ♂ with the same data as the holotype but collected partly May 20, 24.

In the paratypes the areola is more or less developed.

**Sagaritis melanomerus** n. sp.Related to *S. websteri* Viereck.

*Male*. Length 6 mm.; black, antennae black throughout, mandibles mostly yellow, palpi dull stramineous, tegulae yellow, with a broad transparent margin, coxae black, proximal trochanters black with a yellowish, stramineous, apical margin, distal trochanters yellowish stramineous, rest of fore legs stramineous, the end joint of their tarsi blackish, mid femora with their extensor surface reddish stramineous, their flexor surface black, flexor surface of hind tibiae black, their extensor surface stramineous at base and in the middle, blackish at apex and near the base, mid tarsi brownish, pale at base, hind femora black, pale at base and apex, their tibiae colored like the mid tibiae but with darker sub-



basal annulus, hind tarsi blackish, pale at base, abdomen black, plica yellowish; areola finely reticulated, nearly as wide as long, truncate at base, weakly separated from the petiolarea, the latter transversely wrinkled.

*Holotype*—♂, Mt. Washington, N.H., Alp. Gard., July 4, 1914, (C. W. Johnson); Boston Society of Natural History.

***Sagaritis melanocerus* n. sp.**

Related to *S. aequalis* Viereck and *S. citrinus* Viereck which latter may prove to be a race.

*Male*. Length 6 mm.; compared with the original description of *S. aequalis* Vier. this differs as follows.—Fore and mid coxae stramineous beneath, all trochanters except hind proximal pair, yellow, only the hind femora bicolorous, tinged with black at base, extensor surface of fore tibiae yellowish, mid tibiae stramineous, the extensor surface faintly yellowish at base and in the middle, flexor surface of hind tibiae, reddish, their extensor surface yellowish at base and in the middle, blackish at apex and near the base, fore tarsi, mid basitarsi and most of second joint of mid tarsi, stramineous.

*Holotype*—♂, Grimsby, Ont., May 13, 1894; No. 1652 in the Canadian National Collection, Ottawa.

***Sagaritis conspicuosus* n. sp.**

Related to *S. aequalis* Viereck.

*Male*. Length 5 mm.; compared with the original description of *S. aequalis* Vier. this differs as follows. Palpi whitish, fore and mid coxae mostly yellowish white beneath, their proximal trochanters yellowish white with a black stripe above, fore femora black only to the extent of a stripe at base of the extensor surface, inner aspect of mid and hind femora with a black stripe, fore and mid tibiae stramineous with their extensor surface yellowish white, hind tibiae reddish, their extensor surface blackish at base, brownish at apex, yellowish-white in between, apical margin of first and second tergites reddish, apical margin of third tergite with a broader brownish stramineous margin; areola well defined, nearly as long as wide, coarsely sculptured like the petiolarea.

*Holotype*—♂, Oliver, B. C., May 1, 1923, (C. B. Garrett); No. 1657 in the Canadian National Collection, Ottawa.

*Paratype*—♂, collected May 7, otherwise with the same data as the holotype. In this specimen the areola is apparently longer than wide, nearly diamond shaped.

***Sagaritis inconspicuus* n. sp.**

Related to *S. conspicuosus* Viereck.

*Male*. Length 5 mm.; compared with the original description *S. conspicuosus* Vier. this differs as follows. Apical margins of tergites at most obscurely brownish stramineous; areola finely sculptured; extensor surface of hind tibiae nearly all blackish, with only a short yellowish streak.

*Holotype*—♂, Oliver, B. C., May 20, 1923, (C. B. Garrett); No. 1658 in the Canadian National Collection, Ottawa.

***Sagaritis citrinus* n. sp.**

Related to *S. inconspicuus* Viereck.

Compare *S. melanocerus* Viereck and *S. ruficrus* Viereck.

*Female.* Length, 7 mm.; black, antennae black throughout, mandibles mostly yellowish, palpi whitish, tegulae yellowish with a transparent margin, fore and mid coxae reddish stramineous, hind coxae black, fore and mid trochanters yellowish, hind proximal trochanters black, their distal trochanters dark stramineous, femora reddish, fore and mid tibiae stramineous, the extensor surface of the fore pair, whitish of the mid pair whitish, brownish at apex and near base, hind tibiae mostly blackish with a median whitish annulus that has a brownish stripe on its outer aspect, tarsi stramineous and brownish excepting the hind tarsi which are blackish with the basal third of the basitarsi whitish, abdomen black, the third tergite with an apical brownish stramineous margin, plica mostly brownish, partly yellowish; areolet finely reticulated, truncate at base, apparently a little wider than long, confluent with the petiolarea which is feebly transversely costate; sheaths of the ovipositor apparently twice as long as the apical truncature of the abdomen.

*Holotype*—♀, Oliver, B. C., Aug. 6, 1923, (C. B. Garrett); No. 1659 in the Canadian National Collection, Ottawa.

*Paratype*—♀, Macdiarmid, Lake Nipigon, Ont., Aug. 28, 1923, (N. K. Bigelow).

#### ***Sagaritis laevis* n. sp.**

Related to *S. citrinus* Viereck.

If the relation between the ocellular line and the greatest diameter of the lateral ocelli proves to be valueless as a specific character, then this species may prove to be synonymous with *S. aequalis* Vier.

*Female.* Length 5 mm.; compared with the original description of *S. aequalis* Vier. this differs as follows. Hind distal trochanters yellowish throughout, extensor surface of fore tibiae whitish, extensor surface of mid tibiae brownish near base and at apex, hind tarsi brownish; areola well defined, transversely costate much like the petiolarea; sheaths of the ovipositor apparently less than twice as long as the apical truncature of the abdomen.

*Male.* Mid tibiae stramineous with the extensor surface yellowish, hind tibiae with their flexor surface mostly reddish, their extensor surface blackish near base and at apex, yellowish at base and in the middle.

*Holotype*—♀, Oliver, B. C., April 20, 1923, (G. B. Garrett); No. 1663 in the Canadian National Collection, Ottawa.

*Allotype*—♂, with data as in the holotype.

*Paratypes*—♀ with the same data as the holotype, ♂♂, with the same data as the holotype but collected April 24; Vancouver Island; Brooks, Alta., May 20, 1923, alfalfa (Walter Carter).

#### ***Sagaritis teulonensis* n. sp.**

Related to *S. laevis* Viereck.

*Female.* Length 6 mm.; compared with the original description of *S. aequalis* Vier. this differs as follows.—Scape at apex and pedicel partly brownish stramineous, palpi yellowish, fore coxae reddish, black at base and on inner aspect, mid coxae reddish, black at extreme base, fore and mid proximal trochanters black with an apical stramineous margin, distal trochanters yellow, fore and mid femora yellowish at apex, otherwise all femora pale reddish, the hind pair dark reddish, fore and mid tibiae stramineous with their extensor surface mostly

whitish, flexor surface of hind tibiae reddish, their extensor surface blackish at apex and near base, whitish at base and in the middle, fore and mid basi-tarsi stramineous, yellowish at base, their second, third and fourth joints brownish, their fifth joint blackish, abdomen reddish, first tergite black, reddish at apex, basal third of second tergite black, the middle third blackish down the middle, third tergite with a blackish spot at base, fourth and seventh tergites blackish down the middle, areola defined only at base and between the base and the costulae.

*Male.* Agrees in most particulars with the female. Areola complete; abdomen black with a broad apical reddish band to the second, third and fourth tergites, sides of fifth tergite reddish, apical margin of fifth and sixth tergites dark stramineous.

*Holotype*—♀, Saskatoon, Sask., Aug. 9, 1924, No. 16422, 8C7, (Kenneth M. King); No. 1662 in the Canadian National Collection, Ottawa.

*Allotype*—♂, Teulon, Man., Aug. 5, 1923, (A. J. Hunter).

*Paratype*—♀ ♀, two with the same data as the holotype but No. 16423, 7C35, July 18 and 16410, 5N8B, September 8, 1923; one Bilby, Alta., July 20, 1924, (O. Bryant).

#### ***Sagaritis julius* n. sp.**

Related to *S. aprilis* Viereck.

*Male.* Length, 4 mm.; black, antennae black throughout, mandibles mostly yellow, palpi yellowish stramineous, tegulae yellow with a transparent margin, fore and mid legs including coxae mostly pale stramineous, extensor surface of fore and mid tibiae mostly whitish, last joint of tarsi blackish, hind coxae black, their proximal trochanters black with an apical, stramineous margin, hind distal trochanters yellowish, hind femora reddish, blackish at base, hind tibiae and tarsi blackish, the former with the extensor surface stramineous at base and whitish in the middle, the latter with their basitarsi whitish at base, abdomen black, the apical edge of the first tergite, stramineous, second and third tergites with an apical dark stramineous margin, sides of the fourth tergite partly stramineous; areola complete, rather oblong between the costulae and its apex, nearly twice as long as wide, finely sculptured, petiolarea coarsely sculptured, nearly reticulate.

*Holotype*—♂, Waterton Lakes, Alta., July 7, 1923, ex *Choreutis* on *Balsamorhiza* (J. McDunnough); No. 1660 in the Canadian National Collection, Ottawa.

#### ***Sagaritis maius* n. sp.**

Related to *S. julius* Viereck.

*Male.* Length 7 mm.; compared with the original description of *S. julius* Vier. this differs as follows.—Fore and mid trochanters yellowish, last joint of fore and mid tarsi brownish, hind femora reddish throughout, hind tibiae reddish, their extensor surface with the basal fourth and most of the apical third brownish, the remaining portion yellowish, apical edge of first tergite, apical fourth of second tergite, all but base in the middle of fifth tergite, all of sixth tergite and sides of seventh tergite, reddish, rest of tergites black; areola converging posteriorly, nearly as wide as long, petiolarea partly transversely costate.

*Holotype*—♂, Oliver, B. C., April 19, 1923, (C. B. Garrett); No. 1661 in the Canadian National Collection, Ottawa.

**Sagaritis stramineiscapus n. sp.**

Related to *S. oxylus* Cresson.

*Female*. Length 6 mm.; black, scape, pedicel and first joint of flagel in front reddish stramineous, rest of antennae blackish or black, mandibles mostly yellow, palpi yellowish stramineous, legs including coxae reddish excepting the fore mid and hind trochanters which are yellowish, the fore and mid tarsi which are stramineous and brownish, hind tibiae darkened near the base, hind tarsi dark, brownish except for the basal half of the basitarsi which is mostly yellowish, abdomen reddish, petiole mostly black, basal third of second tergite mostly, fifth above, sixth above and partly on the sides and the following mostly, black, plica yellowish; areola apparently one and one half times as long as wide, truncate at base, finely reticulated, with a few oblique costae, petiolarea transversely costate; sheaths of the ovipositor apparently twice as long as the apical truncature of the abdomen.

*Holotype*—♀, Jordan, Ont., August 18, 1914, (W. A. Ross); No. 1664 in the Canadian National Collection, Ottawa.

*Paratype*, ♀, with the same data as the holotype but caught August 11. Differs from the holotype especially in having the postpetiole mostly black, and in having the basal third of the third tergite mostly black.

**Sagaritis taylori n. sp.**

Related to *S. flavicincta* Ashmead.

*Female*. Length 5 mm.; black, antennae black throughout, mandibles mostly yellow, palpi stramineous, tegulae yellow with a transparent border, fore coxae black, brownish stramineous at apex, mid and hind coxae black, fore proximal trochanters yellowish, brownish at base, mid and hind proximal trochanters blackish with an apical yellowish margin, distal trochanters yellowish, rest of legs mostly reddish stramineous, flexor surface of mid femora black at base, their tarsi partly brownish, hind femora blackish at base, their tibiae blackish near base and at apex, yellowish in between, their tarsi black, abdomen mostly black, first tergite pale at apex, second tergite with a narrow apical margin, third tergite with a narrow apical margin, that broadens laterally and lower part of sides of fourth and fifth tergites, reddish, plica yellowish; areola truncate at base, a little longer than wide, confluent with the petiolarea; finely sculptured, the petiolarea transversely costate; sheaths of the ovipositor nearly twice as long as the apical truncature of the abdomen.

*Holotype*—♀, Vancouver Island, B. C., (G. W. Taylor); No. 1668 in the Canadian National Collection, Ottawa.

Named in honor of the Rev. G. W. Taylor.

**Sagaritis modestus n. sp.**

Related to *S. prodeniae* Viereck.

*Male*. Length 5 mm.; compared with the original description of *S. julius* Vier. this differs as follows. Fore and mid trochanters yellow, extensor surface of fore and mid tibiae nearly concolorous with the rest of these tibiae, extensor surface of hind tibiae yellowish stramineous at base and in the middle, hind basitarsi yellowish at base, second and third tergites with an apical reddish margin that is expanded on the sides of the third tergite, sides of the fourth and fifth tergites largely reddish.

*Holotype*—♂, Grimsby, Ont., June 20, 1894; No. 1669 in the Canadian National Collection, Ottawa.

***Sagaritis ruficrus* n. sp.**

Related to *S. consimilis* Ashmead. Compare *S. citrinus* Viereck.

*Male*. Length 6 mm.; compared with the original description of *S. julius* Vier. this differs as follows. Fore and mid trochanters yellow, hind femora reddish throughout, hind basitarsi yellowish at base, narrow apical margin of the second tergite and broader apical margin of the third tergite, reddish, the remaining tergites black, areola confluent with the petiolarea and partly costate, petiolarea transversely costate, sides of the areola between the base and the costulae, diverging.

*Holotype*—♂, Waterton, Alta., July 10, 1923, (H. L. Seamans); No. 1670 in the Canadian National Collection, Ottawa.

***Sagaritis imperfectus* n. sp.**

Related to *S. californicus* Holmgren.

*Female*. Length 5 mm.; black, antennae black throughout, mandibles mostly yellow, palpi yellowish stramineous, fore and mid coxae brownish stramineous, yellowish at apex, fore proximal trochanters partly yellowish, mid proximal trochanters black with a yellow apical margin, hind coxae black, hind proximal trochanters black with the apical margin, yellowish, all distal trochanters yellowish, rest of legs reddish, stramineous except as follows.—extensor surface of fore tibiae mostly yellowish, their tarsi brownish stramineous, extensor surface of mid tibiae brownish, dull yellowish at base and in the middle, their tarsi darker than fore tarsi, hind femora blackish at base, their tibiae blackish near the base, yellowish at base and in the middle, blackish at apex, flexor surface, reddish stramineous, hind tarsi blackish, all basitarsi yellowish at base, abdomen black, first tergite apically reddish, apical fourth of second tergite reddish, apical third of third tergite and part of the middle third on the side reddish, fourth tergite with an apical margin and sides reddish, fifth and sixth tergites with the sides nearly reddish stramineous, plica brownish-yellow; areola truncate at base, finely sculptured, confluent with the transversely costate petiolarea; sheaths of the ovipositor apparently twice as long as the apical truncature of the abdomen.

*Holotype*—♀, Saskatchewan, (James Fletcher); No. 1655 in the Canadian National Collection, Ottawa.

*Paratype*—♀ ♀, one with the same data as the holotype; Carberry, Manitoba, July 8, Sudbury, Ont., 1892; Saskatoon, Saskatchewan, July 7, 29, 1924, No. 16425, 6B.19, 8C16 (Kenneth M. King). The paratypes from Saskatoon have the mid coxae black or blackish.

***Sagaritis interruptus* n. sp.**

Related to *S. imperfectus* Viereck.

*Male*. Length 5 mm.; compared with the original description of *S. imperfectus* Vier. this differs as follows.—Fore and mid coxae and trochanters and hind distal trochanters lemon yellow, extensor surface of hind tibiae blackish with a yellowish streak down the middle, hind femora reddish throughout, first tergite apically with a pale stramineous edge, second tergite with a narrow, yellowish stramineous, apical margin, seventh tergite laterally, along the lower margin, stramineous, plica yellowish; areola weakly separated from the petio-



larea, but not from the area dentipara, areola and petiolarea rugulose, nearly coarsely reticulated.

*Holotype*—♂, Grimsby, Ont., September 18, 1918, (W. A. Ross); No. 1654 in the Canadian National Collection, Ottawa.

***Sagaritis apicatus* n. sp.**

Related to *S. imperfectus* Viereck.

*Female*. Length 5 mm.; compared with the original description of *S. imperfectus* Vier. this differs as follows.—Scape and pedicel partly dark, stramineous beneath, flagel dark brownish beneath, mandibles mostly yellowish, fore and mid coxae pale stramineous, all but hind proximal trochanters yellowish, fore and mid legs mostly stramineous, extensor surface of mid tibiae mostly yellowish brownish near base and at apex, hind femora dark stramineous throughout, hind tibiae brownish near base and at apex, first tergite apically pale stramineous, apical fourth of second, apical half of third and all of the remaining tergites pale stramineous; areola broadly truncate at base, finely sculptured, confluent with the equally finely sculptured petiolarea; sheaths of the ovipositor apparently not more than one and one-half times as long as the apical truncature of the abdomen.

*Holotype*—♀, Sudbury, Ont.; No. 1653 in the Canadian National Collection, Ottawa.

***Sagaritis basalis* n. sp.**

Related to *S. ruficoxalis* Viereck.

*Female*. Length 4.5 mm.; black, scape brownish in front, rest of antennae almost entirely black, mandibles mostly yellow, palpi yellowish, tegulae yellow with a transparent margin, legs including coxae stramineous excepting as follows.—Fore, mid and distal hind trochanters yellowish, hind proximal trochanters partly brownish, partly blackish, with an apical yellowish margin, extensor surface of mid tibiae pale brownish near base and at apex, mid tarsi brownish apically, the apical joint blackish, extensor surface of hind tibiae blackish near base and at apex, hind tarsi blackish save for the base of the basitarsi which is whitish, first tergite black excepting apical half of postpetiole which is reddish, second tergite reddish with an emarginate black, basal border, third tergite reddish, with a rounded black border at base, fourth tergite reddish, blackish at base in the middle, the remaining tergites black above, more or less stramineous on the sides, plica yellow; areola apparently as wide as long, truncate at base, finely sculptured, weakly separated from the transversely costate petiolarea; abdomen truncate at apex, sheaths of the ovipositor exerted.

*Male*. Agrees with the above description of the female except as follows, extensor surface of mid tibiae yellowish, areola confluent with the more finely hardly transversely costate petiolarea.

*Holotype*—♀, Ottawa, Ont., 1885, (W. H. Harrington); No. 1667 in the Canadian National Collection, Ottawa.

*Allotype*—♂, Ottawa, Ont., (W. H. Harrington).

***Sagaritis nigriscapus* n. sp.**

Related to *S. basalis* Viereck. Compare *S. oxylus* Cresson, *S. conjunctiformis* Viereck and *S. stramineiscapus* Viereck.

Male. Length, 5 mm.; compared with the original description of *S. basalis* Vier. this differs as follows,—scape black throughout, extensor surface of mid tibiae whitish, extensor surface of hind tibiae black at base and apex, whitish in between, flexor surface stramineous, black at base, first tergite black with the apical edge stramineous, second tergite black with the apical third reddish, areola distinctly longer than wide.

*Holotype*—♂, Saskatoon, Sask., May 14, 1924, No. 16423, 3C2, (Kenneth M. King); No. 1665 in the Canadian National Collection, Ottawa.

***Sagaritis garretti* n. sp.**

Related to *S. basalis* Viereck.

*Female*. Length 5 mm.; compared with the original description of *S. basalis* Vier. this differs as follows.—Legs, including coxae, reddish stramineous, excepting as follows,—fore, mid and hind distal trochanters yellowish, fore proximal trochanters stramineous, yellowish at apex, mid proximal trochanters darker than the fore proximal trochanters but not as dark as the hind proximal trochanters, hind tibiae dark stramineous, blackish near base and at apex, first tergite black with an apical reddish margin; areola nearly acute angled at base, nearly twice as long as wide, weakly separated from the nearly transversely costate petiolarea; abdomen clavate at apex, sheaths of the ovipositor apparently as long as the first tergite.

*Holotype*—♀, Oliver, B.C., April 3, 1923, (C. B. Garrett); No. 1666 in the Canadian National Collection, Ottawa.

Named in honor of Mr. C. B. Garrett.

***Sagaritis Holmgren*.**

In the key (Can. Ent., LVII, p. 199) for segment read tergite, for *hexagonalis* n. sp. read 50, for *atkinsoni* read 25.1, and insert—

25.1 Hind tibiae partly whitish ..... *atkinsoni* n. sp.

Hind tibiae not partly whitish ..... *interruptus* n. sp.

for *englishi* read 40.1 and insert—

40.1 Sides of the second and third tergites mostly reddish, *imperfectus* n. sp.

Sides of the second and third tergites mostly black ..... *englishi* n. sp.

page 200, for *kingi* read 47.1 and insert—

47.1 Hind femora not blackish at base ..... *kingi* n. sp.

Hind femora blackish at base ..... *websteri* Vier.

for *maius* read 58.1 and insert—

58.1 Areola complete ..... *maius* n. sp.

Areola incomplete ..... *teulonensis* n. sp.

59 cross out *teulonensis* and *laevis*, for *aequalis* Vier. penultimate line substitute *laevis* n. sp.

(*Limnerium*) *Sagaritis compactus* Provancher.

(*Ischnoscopus*) *Sagaritis taeniatatus* Viereck.

(*Mesoleptus*) *Sagaritis conjunctus* Cresson.

(*Limnerium*) *Sagaritis nephelodis* Ashmead.

(*Limnerium*) *Sagaritis perdistinctus* Viereck.

(*Amorphota*) *Sagaritis nocturnus* Viereck.

(*Angitia*) *Sagaritis websteri* Viereck.

(*Limnerium*) *Sagaritis striatipes* Ashmead.

- (*Limnerium*) *Sagaritis occidentalis* Ashmead.  
 (*Limnerium*) *Sagaritis oxylus* Cresson.  
 (*Limnerium*) *Sagaritis lawrencei* Viereck.  
 (*Limnerium*) *Sagaritis flavicinctus* Ashmead.  
 (*Limnerium*) *Sagaritis yakutatensis* Ashmead.  
 (*Campopletis*) *Sagaritis prodeniae* Viereck.  
 (*Limnerium*) *Sagaritis consimilis* Ashmead.

## KEY TO THE SUBGENERA OF CAMPOPLEX GRAVENHORST.

Can. Ent., LVII, p. 202, for *Hypothereutes* Foer. and what is between that name and "right angle," substitute 10.1 and insert—

- 10.1 Ovipositor prominently exserted; areola and petiolarea confluent .....  
 ..... *Bathyplectes* Foer.  
 Ovipositor not prominently exserted ..... *Hypothereutes* Foer.

**Campoplex (Campoplex) tecumseh n. sp.**

Related to *C. relativus* Viereck.

*Male*. Length 4.5 mm.; black, antennae black throughout, mandibles mostly yellow, palpi whitish, tegulae yellow, with a transparent margin, fore and mid coxae black, the apical third stramineous, hind coxae black, fore and mid and hind distal trochanters yellowish, rest of fore and mid legs mostly pale reddish stramineous, end joint of their tarsi blackish, some of the other joints of mid tarsi partly brownish, hind proximal trochanters blackish with an apical yellowish margin, hind femora reddish, faintly darkened at base, flexor surface of hind tibiae reddish, blackish at apex and pale at base, their extensor surface blackish near base and at apex, stramineous in between, yellowish at base, hind tarsi blackish, pale at base, abdomen black, tergites 1, 2, 3 and 4 with a narrow apical, stramineous margin, plica mostly yellow; areola nearly acute angled at base, narrowly truncate, coarsely sculptured, confluent with the nearly reticulate petiolarea, apparently one and one-half times as long as wide, its sides between the costulae and the petiolarea nearly parallel.

*Holotype*—♂, Jordan, Ont., July 22, 1919, (W. A. Ross); No. 1671 in the Canadian National Collection, Ottawa.

**Campoplex (Campoplex) sulcatellus n. sp.**

Related to *C. relativus* Viereck.

*Female*. Length, 7 mm.; compared with the original description of *C. tecumseh* Vier. this differs as follows.—Palpi stramineous, fore and mid coxae brownish at apex, rest of fore and mid legs stramineous, their mid tarsi partly brownish, hind distal trochanters black at base, yellowish at apex, stramineous in between, hind femora and flexor surface of hind tibiae, reddish, extensor surface of hind tibiae yellowish at base and in the middle, brownish near base and at apex, tergum of abdomen black throughout, its plica yellowish and blackish; propodeum deeply channelled, with transverse costae in the bottom of the channel, virtually only the basal transverse carina developed and that incomplete, areola smooth and nearly truncate at base; abdomen nearly truncate at apex, its sheaths prominently exserted.

*Holotype*—♀, Indian Head, Sask., July 5, 1895, (J. Fletcher); No. 1672 in the Canadian National Collection, Ottawa.

(To be continued)

Mailed Saturday, May 22nd, 1926.

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